

FLORA OF THE MONOMOY ISLANDS CHATHAM, MASSACHUSETTS

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ABSTRACT

The flora of the Monomoy Islands has been sporadically investigated from 1932 to 1989. Previous plant species lists and herbarium vouchers were reviewed and compared to floral inventories during 1981, 1983, 1984, 1985, and 1989. A master plant list was then developed that noted the abundance and general distribution of each plant species, as well as possible misidentifications from previous studies.

Key Words: barrier beach flora, Monomoy National Wildlife Refuge, Massachusetts

INTRODUCTION

The Monomoy Islands are part of the 1317 ha Monomoy National Wildlife Refuge, administered by the U.S. Fish and Wildlife Service. The refuge, which includes North Monomoy Island (North Island), South Monomoy Island (South Island), and portions of Morris Island, is located at the “elbow” of Cape Cod in the town of Chatham, MA, and extends south 13 km into Nantucket Sound (Figure 1). New islands accreting west of this area, up to a declaration of taking line in Nantucket Sound, will also become part of the refuge. These barrier islands were created by the littoral drift of unconsolidated glacial deposits from the sea cliffs of Eastham and Wellfleet (Giese, 1981).

The Monomoy Islands are part of the extremely dynamic outer coast of Cape Cod that is continually modified by wave, wind, and tidal action. Over hundreds of years these islands have evolved from a submerged sandbar to an extension of the mainland. This barrier island system contained distinctive arcuate dune ridges on the downdrift portion of the system (southern South Island) and erosional features updrift, during our study period. These included dune scarping and washover fans on North Island (Leatherman, 1979). The southern third of South Island has been slowly increasing in size. However, the North Island and the northern portion of the south Island have undergone some major changes during the last 200 years (Giese, 1981).

The Inward Point and Hospital Pond areas (Figure 1) have changed considerably since the mid-nineteen sixties when Moul

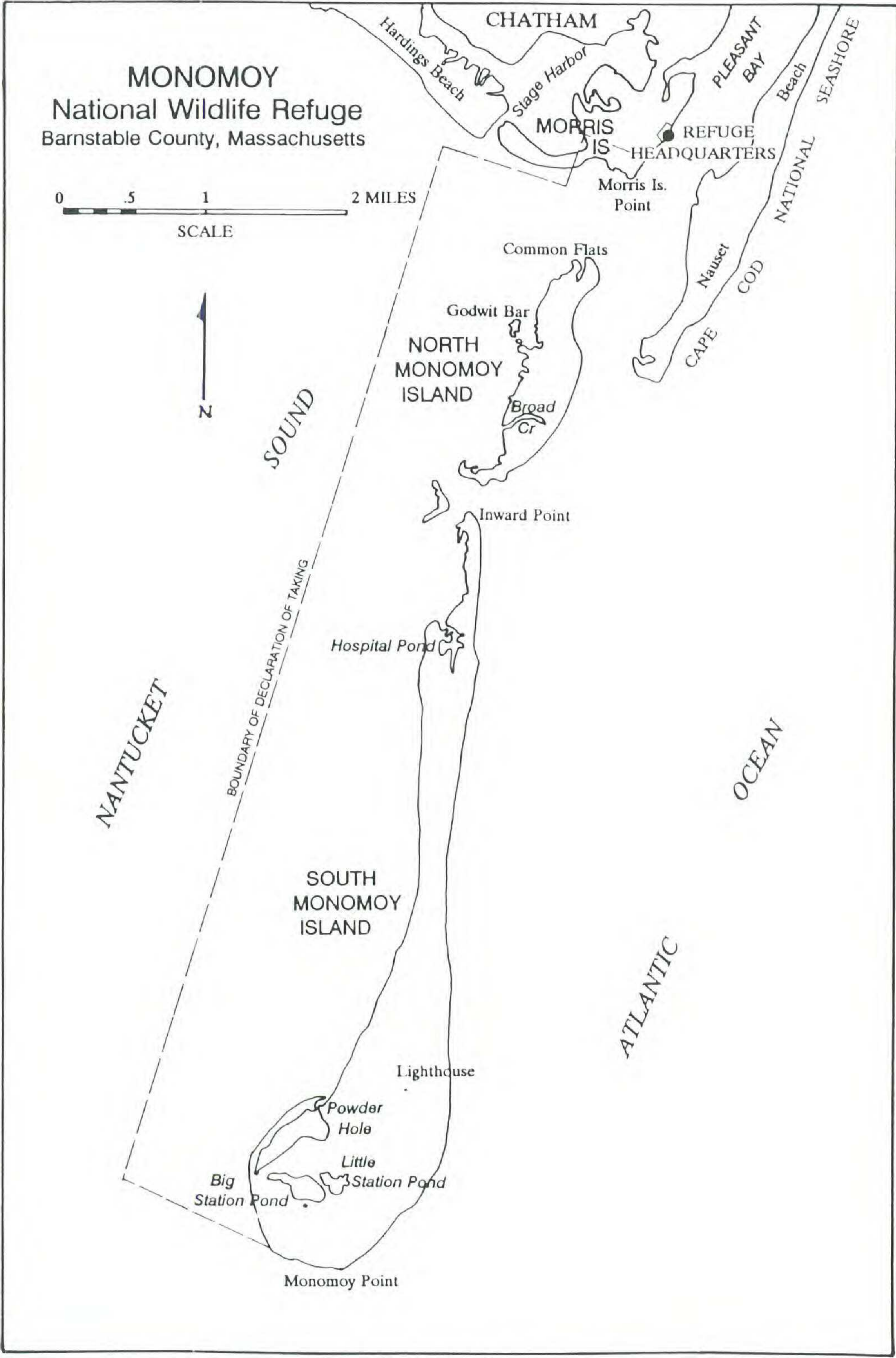


Figure 1. Monomoy National Wildlife Refuge, Chatham, Massachusetts.

(1969) was investigating Monomoy's flora. He reported that the most mature vegetation of the island (there was only one island then) was located in these areas, including a large freshwater marsh. The surrounding thickets then contained examples of most of the island's vegetation. A powerful northeast storm washed over this area in 1978 and destroyed almost all of the freshwater marsh and woody thickets. Surging waters from the storm cut a channel through the island into Nantucket Sound which persists today.

South Island contains many natural and several man-made fresh and brackish-water ponds, which vary in size from 1 ha to 27 ha. The plant communities on this island are much more diverse than those of North Island. According to the Cowardin et al. (1979) wetlands classification system the islands contain 322 ha in marine systems, 11 ha in lacustrine systems, 44 ha in palustrine systems, and 143 ha in estuarine systems. There are an additional 709 ha of drier habitat, consisting of primary and secondary dunes.

The flora of the Monomoy Islands has been reported on a number of times from 1954 to the present (Cross and Cross, 1954 unpubl. list; Bailey, 1965; Moul, 1969; Massachusetts Audubon Society, 1972; Schrot, 1985). The earliest Monomoy specimen of which we are aware dates from 1932. No specimens are available as vouchers for species listed in the 1954 and 1965 reports, but we have examined all of those of Moul (at SPWH) and those of the Massachusetts Audubon Society (collected by H. K. Svenson and W. Bailey, at NEBC).

Our objectives are to summarize all previous investigations, describe the vegetation of the islands during the summers of 1981, 1983, 1984, and 1985, and compile a master plant list. We feel that the synthesis of previous and current floristic work is important for three reasons: 1) to gather into one publication material which is now scattered and in some cases unavailable; 2) to provide a basis for future comparative work in a dynamic ecosystem; and 3) to document the flora as it currently exists as an aid to future management decisions. As Moul (1969) indicated, the flora of islands changes with time; new species appear, others disappear, and the distribution and abundance of each species varies. Our list contains species we documented from 1981 to 1989, species which were reported in previous years that may still occur but were not found during our survey, and taxa which represent possible misidentifications from other investigations.

Morris Island has been excluded from consideration, due to its direct connection to the mainland and the large number of mainland species found there. Our list more than doubles the number of species listed by Moul (1969), heretofore the most accessible reference on Monomoy's flora.

METHODS

The Monomoy Islands were surveyed during the summers of 1981, 1983, 1984, and 1985. A few additional species were documented in a brief visit to North Island, 1989. Broad vegetational community types were identified on both islands and then transected as completely as possible on foot by criss-crossing through each area. Special attention was given to unusual habitats as sources of overlooked species. Areas surrounding the South Island ponds contained the greatest plant diversity, therefore more time was spent examining them. Each community type was inventoried at least once each month from May to September during 1983 and 1984. Sampling occurred less frequently in 1981 and 1985. Herbarium vouchers were collected and deposited in the personal herbarium of J. Lortie. Vouchers were collected for approximately sixty percent of the species on the Master Plant List.

In the Master Plant List, the dates 1954, 1965, 1969, and 1972 refer to previous workers' lists, unless otherwise stated. The date 1985 includes observations by Schrot (1985) as well as the current authors. In order to reduce confusion and enhance direct comparisons among the various species lists, nomenclature used in the Master Plant List is that of Fernald (1950).

Plant species lists from previous botanical investigations were obtained from literature searches and supplemented by data extracted from the herbarium of the New England Botanical Club (NEBC), the Gray Herbarium (GH), and the G. M. Gray Herbarium at the Marine Biological Laboratory (SPWH). The 1954 unpublished plant list by S. G. Cross and C. E. Cross was provided by Marcia G. Norman.

Each species on the Master Plant List was accorded one of the following designations: cultivated, rare, occasional, common, or abundant (Table 1). The general habitat of each plant species was listed by broad plant community types including: beaches and sandspits, primary dunes, secondary dunes, salt marshes, permanent ponds, seasonal ponds, and bogs.

Table 1. Plant species status designations and definitions.

Designation	Definition
Cultivated	Planted by humans
Rare	Observed on the islands less than five times
Occasional	Occurs locally, not expected to be seen in a day trip
Common	Expected to be seen in a day trip
Abundant	Occurs throughout a major portion of the islands

Beaches and sandspits included sparsely vegetated areas occurring from mean high water inland up to primary and secondary dunes and/or salt marshes. These areas were greatly influenced by wind, wave, and tidal action, and were the most dynamic community type on the islands. Washover areas were included in this community.

The easternmost dune complex on the islands is regarded as primary dune. These areas were mainly modified by storm surges and aeolian erosion. Secondary dune areas included all inner or western dunes and contained several plant community types. Major secondary dune modifications included aeolian erosion and nesting herring gulls (*Larus argentatus*) and great black-backed gulls (*Larus marinus*).

Salt marsh communities included tidal flats and drainage channels, and regularly and irregularly flooded marsh. The daily tidal cycle, flooding range, and sediment transport determined the distribution of this community type on the islands.

Permanent ponds were defined as continually flooded, open and semi-open water bodies. These ponds did not dry up during the summer, whereas seasonal ponds usually did. Seasonal ponds included cranberry swales, wet marshy swales, and wet thickets. Precipitation and storm surges were the dominant modifiers of permanent and seasonal ponds. High seas, usually associated with severe storms, can erode primary dunes and flood some seasonal ponds, an occurrence observed in 1983 and 1984. Low wet areas dominated by sphagnum moss are regarded as bogs; these areas did not dry up during the summer.

PLANT COMMUNITY DESCRIPTIONS

The eastern beaches and sandspits on both islands contained the youngest plant communities. These area were sparsely pop-

ulated with *Cakile edentula* (Bigel.) Hook., *Solidago sempervirens* L. and *Xanthium strumarium* L. The western beaches, which were protected from the open ocean, contained a more developed plant community. In these areas, besides the above mentioned species, *Lathyrus japonicus* Willd., *Atriplex arenaria* Nutt., *Salsola kali* L. and *Arenaria peploides* L. predominated. Following the blizzard of 1978 that split Monomoy Island in two, extensive new sandspits formed at the Inward Point area (Figure 1). *Ammophila breviligulata* Fern. was slowly colonizing portions of these spits that were above mean high water.

The dominant plant on both islands was *Ammophila breviligulata* Fern., which covered almost all of the primary dunes and a substantial portion of the secondary dunes. Common associates of *Ammophila* in the primary dunes were *Solidago sempervirens* L., *Chrysopsis falcata* (Pursh) Ell., and *Lathyrus japonicus* Willd. Owing to the dynamic nature of these barrier islands, many of the primary dunes on North Island and the northern third of South Island were actually secondary dunes at one time. Erosion of the outer primary dune resulted in these areas becoming the easternmost dune system. Therefore some of these areas contained species characteristic of secondary dunes, including *Myrica pensylvanica* Loisel., *Prunus maritima* Marsh., and *Rosa rugosa* Thunb.

The secondary dune system supports the most extensive community on the islands. Relatively stable areas within *Ammophila breviligulata* communities supported thickets of *Myrica pensylvanica*, *Rosa rugosa*, *Rhus radicans* L. and *Prunus maritima*. A large portion of this dune system north and south of the lighthouse was dominated by *Hudsonia tomentosa* Nutt., *Lechea maritima* Leggett and a lichen (*Cladonia* sp.). These gently undulating areas are called "moors" by some Cape Codders.

Nesting gulls occupied approximately sixty percent of the secondary dune habitat on both islands during our study. Gulls within these colonies created large areas of disturbed sandy soil mixed with droppings and uneaten animal matter, suitable for many adventive and weedy species. Black-crowned night-herons (*Nycticorax nycticorax*) and snowy egrets (*Egretta thula*) nested in dense colonies on *Salix bebbiana* Sarg.; concentrations of their droppings apparently killed some of these shrubs. Other animals affecting vegetation in the secondary dune community were white-tailed deer (*Odocoileus virginianus*) and muskrats (*Ondatra zi-*

bethica). These two species foraged extensively on herbaceous vegetation located in transition zones between wetland and secondary dune systems. White-tailed deer appeared to favor *Rhus radicans* in the early spring before other vegetation leafed out. The first clumps of sedges and rushes to green up in the spring were readily consumed by the deer in 1983 and 1984.

The extensive salt marshes of the North Island and northern South Island were dominated by *Spartina alterniflora* Loisel. and *S. patens* (Ait.) Muhl. Common associates included *Distichlis spicata* L., *Juncus gerardi* Loisel., *Triglochin maritima* L. and *Limonium carolinianum* (Walt.) Britt. *Spartina alterniflora*, *Zostera marina* L. and *Ruppia maritima* L. grew in the tidal creeks. Members of the genera *Salicornia* and *Suaeda* grew in the shallow salt pannes throughout the marshes, as well as on flats exposed at low tide.

All the permanent ponds occurred on the southern half of South Island, the oldest and most stable portion of the Monomoy Islands. Big and Little Station Ponds and the Lighthouse Ponds were surrounded by thickets of *Myrica pensylvanica*, *Prunus maritima*, *Rhus radicans* and *Salix bebbiana*. Beneath the thickets was a carpet of *Ptilimnium capillaceum* (Michx.) Raf., *Galium trifidum* L. and *Thelypteris palustris* (L.) Gray. The Lighthouse Ponds also contained extensive stands of *Typha angustifolia* L., the only freshwater marsh habitat on the islands. Aquatic vegetation in the ponds included *Potamogeton pectinatus* L., *P. perfoliatus* L. var. *bupleuroides* (Fern.) Farw., *Ceratophyllum demersum* L., *Spirodela polyrhiza* (L.) Schleid. and *Nymphaea odorata* Ait. Along the pond margins grew *Cyperus filicinus* Vahl, *Iris versicolor* L., *Polygonum hydropiperoides* Michx., *Teucrium canadense* L. and *Scutellaria epilobiifolia* A. Hamilton. Associated with these species was a wide array of herbs dependent on low water levels during summer and fall.

The many seasonal ponds and wet depressions contained lush borders of *Eleocharis halophila* Fern. & Brack., *Carex atlantica* Bailey, *Juncus effusus* L. and *Iris versicolor* L. On the gentle slopes surrounding the seasonal ponds *Rhus radicans*, *Myrica pensylvanica*, *Thelypteris palustris* and *Teucrium canadense* grew. The seasonal ponds on the northern half of South Island were surrounded by *Salix bebbiana*, *Prunus maritima* and *Vaccinium corymbosum* L. These areas were flooded by storm surges during the winters of 1983 and 1984, and contained a less diverse plant

population than seasonal ponds not subjected to inundation by salt water.

The southern third of South Island contained a number of small bogs dominated by *Sphagnum* sp., *Carex canescens* L., *Eriophorum virginicum* L. and *Vaccinium macrocarpon* Ait. Occasionally found with these species were *Drosera rotundifolia* L. and *Pogonia ophioglossoides* (L.) Ker; *Lyonia ligustrina* (L.) DC, *Myrica pennsylvanica* and *Prunus maritima* surrounded the bogs. Collectively these bogs, seasonal ponds, and wet depressions, with their variability in soil moisture and organic content, provided habitat for a large diversity of plant species. Many of the islands' rarities occurred in or near them, including *Habenaria lacera* (Michx.) Lodd., *Gaylussacia baccata* (Wang.) K. Koch, *Equisetum arvense* L., *Ophioglossum vulgatum* L. and *Linum striatum* Walt.

Human impact on the plant communities decreased significantly after 1972 when off-road vehicles were banned on the islands. Only two seasonal cabins remained on South Island in 1986. All other cabins were removed when life-tenancy permits expired, but the surrounding cultivated vegetation was left. *Pinus thunbergii* Parl., *Elaeagnus umbellata* Thunb., *Pyrus communis* L. and *P. malus* L. were examples of surviving cultivated and/or introduced plants found during our study. The Monomoy Islands have a rich and interesting history of human settlement and abandonment, a detailed account of which can be found in a publication prepared by the Massachusetts Audubon Society (1972).

MASTER PLANT LIST

Pteridophyta

EQUISETACEAE

Equisetum arvense L.—Rare. Recorded in 1984. Seasonal ponds.

LYCOPODIACEAE

Lycopodium inundatum L.—Occasional. Recorded in 1965, 1972. Bogs. All *L. inundatum* records probably refer to the var. *bigelovii*, common in southeastern Massachusetts. We were unable to locate any populations of the nominate variety.

Lycopodium inundatum L. var. *bigelovii* Tuckerm.—Occasional. Recorded in 1969, 1981, 1984. Bogs and seasonal ponds. Moul's specimens were cited (1969) as nominate *L. inundatum*, but clearly belong to var. *bigelovii*.

OPHIOGLOSSACEAE

Ophioglossum vulgatum L.—Rare. Discovered in 1966 by R. Chandler near Big Station Pond, photographed by BAS in 1972 and not recorded since.

OSMUNDACEAE

Osmunda regalis L.—Common. Recorded in 1954, 1965, 1972, 1984. Ponds and seasonal ponds.

Osmunda cinnamomea L.—Common. Recorded in 1965, 1969, 1972, 1981, 1983, 1984. Ponds, seasonal ponds and bogs.

POLYPODIACEAE

Onoclea sensibilis L.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Ponds and seasonal ponds.

Dryopteris thelypteris (L.) Gray var. *pubescens* (Lawson) Nakai—Abundant. Recorded in 1954, 1965, 1969, 1972, 1981, 1983, 1984. Ponds, seasonal ponds and bogs.

Dryopteris spinulosa (O. F. Muell. Watt var. *intermedia* (Muhl.) Underw. [= *Dryopteris austriaca* (Jacq.) Woyner var. *intermedia* (Muhl.) Morton]—Rare. Recorded in 1965, 1972. Unknown location.

Gymnospermae

PINACEAE

Pinus resinosa Ait.—Cultivated. Recorded in 1965. Unknown location.

Pinus sylvestris L.—Cultivated. Recorded in 1969. Secondary dunes near Inward Point.

Pinus rigida Mill.—Occasional. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Secondary dunes.

Pinus thunbergii Parl.—Cultivated. Recorded in 1965, 1972, 1984. Secondary dunes.

Juniperus virginiana L.—Occasional. Recorded in 1969, 1984. Secondary dunes. Some plants may have been cultivated.

Angiospermae — Monocotyledoneae**TYPHACEAE**

Typha angustifolia L.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Ponds and seasonal ponds.

ZOSTERACEAE

Zostera marina L. var. *stenophylla* Aschers. & Graebn.—Abundant. Recorded in 1954, 1965, 1972, 1984. Tidal mudflats.

Potamogeton pectinatus L.—Abundant. Recorded in 1954, 1965, 1972, 1984. Ponds.

Potamogeton crispus L.—Recorded in 1965, 1972. May have been mistaken for *P. perfoliatus* var. *bupleuroides*. Ponds.

Potamogeton perfoliatus L. var. *bupleuroides* (Fern.) Farw.—Common. Recorded in 1983, 1984. Ponds.

Ruppia maritima L.—Occasional. Recorded in 1969, 1984. Tidal creeks and pools.

JUNCAGINACEAE

Triglochin maritima L.—Abundant. Recorded in 1969, 1984. Salt marshes.

GRAMINEAE

Bromus tectorum L.—Occasional. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.

Bromus commutatus Schrad.—Rare. Recorded in 1984. Border of bog.

Festuca rubra L.—Common. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Secondary dunes, salt marshes and seasonal ponds.

Puccinellia maritima (Hudson) Parl.—Rare. Recorded in 1989. Salt marsh on North Monomoy.

Eragrostis pilosa L. Beauv.—Recorded in 1972. Unknown location.

Distichlis spicata L. Greene—Common. Recorded in 1965, 1972, 1984. Salt marshes.

Phragmites communis Trin.—Common. Recorded in 1969, 1972, 1983, 1984. Ponds and seasonal ponds.

Agropyron pungens (Pers.) R. & S.—Common. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Borders of salt marshes and secondary dunes.

- Agropyron repens* (L.) Beauv.—Occasional. Recorded in 1984. Secondary dunes.
- Elymus virginicus* L. var. *halophilus* (Bickn.) Wieg.—Rare. Recorded in 1969. Border of salt marsh, Inward Point. Moul collected two specimens; both prove to be *Agropyron pungens*, so the genus *Elymus* remains unrecorded for the Monomoy Islands.
- Aira caryophyllea* L.—Rare. Recorded in 1972. Unknown location.
- Danthonia spicata* (L.) Beauv.—Rare. Recorded in 1983. Secondary dunes.
- Ammophila breviligulata* Fern.—Abundant. Recorded in 1965, 1969, 1972, 1981, 1984. Primary and secondary dunes.
- Agrostis alba* L. var. *palustris* (Huds.) Pers.—Common. Recorded in 1954, 1969, 1972, 1984. Secondary dunes, seasonal ponds and borders of salt marshes.
- Agrostis tenuis* Sibth.—Occasional. Recorded in 1965, 1972. Unknown location.
- Agrostis hyemalis* (Walt.) BSP.—Occasional. Recorded in 1965, 1969, 1972. Unknown location. This and the following species are often considered to be part of one variable species. Moul's specimen, although cited (1969) as *A. scabra*, appears to be *A. hyemalis* due to its small spikelets.
- Agrostis scabra* Willd.—Occasional. Recorded in 1983, 1984. Seasonal ponds.
- Spartina alterniflora* Loisel.—Abundant. Recorded in 1965, 1969, 1972, 1984. Salt marshes and tidal mudflats.
- Spartina patens* (Ait.) Muhl.—Abundant. Recorded in 1965, 1969, 1972, 1984. Salt marshes.
- Leersia oryzoides* (L.) Sw.—Rare. Recorded in 1965, 1972. Unknown location.
- Digitaria sanguinalis* (L.) Scop.—Rare. Recorded in 1972, 1984. Secondary dunes and seasonal ponds.
- Panicum dichotomiflorum* Michx.—Occasional. Recorded in 1972. Borders of salt flats and permanent ponds.
- Panicum virgatum* L. Abundant.—Recorded in 1965, 1969, 1972, 1983, 1984. Secondary dunes, ponds, and seasonal ponds. Specimens examined are var. *spissum* Linder.
- Panicum meridionale* Ashe—Common. Recorded in 1972, 1984. Secondary dunes and seasonal ponds.

Panicum lanuginosum Ell. var. *implicatum* (Scribn.) Fern.—Recorded in 1954, 1965, 1972, 1984. Secondary dunes and seasonal ponds.

Panicum clandestinum L.—Rare. Recorded in 1984. Secondary dunes.

Andropogon scoparius Michx.—Common. Recorded in 1965, 1972, 1983, 1984. Secondary dunes.

Andropogon virginicus L. var. *virginicus*—Occasional. Recorded in 1984. Seasonal ponds.

Andropogon virginicus L. var. *abbreviatus* (Hack.) Fern. & Griscom—Occasional. Recorded in 1972, 1981, 1984. Bogs and seasonal ponds.

CYPERACEAE

Cyperus diandrus Torr.—Recorded in 1986. Borders of permanent ponds. Specimen at SPWH collected by Buckley and Hendrickson.

Cyperus filicinus Vahl—Occasional. Recorded in 1965, 1972, 1981, 1984. Borders of permanent ponds and seasonal ponds.

Cyperus strigosus L.—Occasional. Recorded in 1983, 1984. Seasonal ponds and secondary dunes.

Cyperus Grayi Torr.—Occasional. Recorded in 1965, 1969, 1972, 1983, 1984. Secondary dunes.

Cyperus filiculmis Vahl—Occasional. Recorded in 1972, 1984. Secondary dunes.

Eleocharis parvula (R. & S.) Link—Common. Recorded in 1954, 1965, 1969, 1972, 1981, 1984. Permanent and seasonal ponds.

Eleocharis palustris (L.) R. & S.—Recorded in 1954, 1965. Unknown location. Possibly mistaken for *E. halophila*; *E. palustris* prefers strictly fresh water.

Eleocharis halophila Fern. & Brack.—Common. Recorded in 1954, 1965, 1969, 1972, 1981, 1983, 1984. Ponds and seasonal ponds. Also collected in 1986 by Buckley (SPWH).

Eleocharis tenuis (Willd.) Schultes—Rare. Recorded in 1984. Bogs. Possibly *E. elliptica* Kunth.; no specimen was preserved.

Scirpus americanus Pers.—Common. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Ponds and seasonal ponds.

- Scirpus validus* Vahl—Occasional. Recorded in 1954, 1965, 1972, 1983, 1984. Seasonal ponds.
- Scirpus acutus* Muhl.—Recorded in 1965, 1972. Unknown location. Possibly mistaken for *S. validus*, the common species of southeastern Massachusetts; no specimen has been found.
- Scirpus robustus* Pursh—Rare. Recorded in 1965, 1972. Unknown location. These records are based on a specimen from “salt marsh, Morris Island, Chatham,” 28 August 1928, *Fernald* 824 (NEBC). However, this species is expected to occur on Monomoy and perhaps did so at the Inward Point marshes.
- Scirpus maritimus* L.—Rare. Recorded in 1954, 1965, 1972. Unknown location. Probably refers to *S. maritimus* var. *fernaldi* (Bickn.) Beetle, also known as *S. novae-angliae* Britt., or to *S. paludosus*. True *S. maritimus* is a European waif unknown in Massachusetts.
- Scirpus paludosus* Nelson—Recorded in 1938 from “borders of pools, Monomoy, Chatham,” *Seymour* 5137 (NEBC).
- Scirpus cyperinus* (L.) Kunth—Common. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Seasonal ponds.
- Eriophorum virginicum* L.—Occasional. Recorded in 1965, 1969, 1972, 1981, 1983, 1984. Bogs.
- Rhynchospora capitellata* (Michx.) Vahl—Occasional. Recorded in 1972, 1981, 1983, 1984. Seasonal ponds and bogs.
- Carex canescens* L.—Occasional. Recorded in 1972, 1984. Bogs and seasonal ponds.
- Carex atlantica* Bailey—Occasional. Recorded in 1984. Seasonal ponds.
- Carex seorsa* Howe—Recorded in 1972. Unknown location. This record is based on a specimen from “wet mossy woods at edge of cedar swamp, Monomoy, Chatham,” 19 June 1932, *Weatherby* 6164 (NEBC). Since Monomoy has not supported a cedar swamp, we believe that the label is in error and that the specimen was likely collected on the mainland in Chatham.
- Carex scoparia* Schkuhr—Recorded in 1965, 1972. Unknown location.
- Carex albolutescens* Schwein.—Occasional. Recorded in 1984. Seasonal ponds and bogs.

Carex longii Mackenz.—Occasional. Recorded in 1969. Seasonal ponds. *C. longii* is now included in *C. albolutescens*.

Carex silicea Olney—Common. Recorded in 1954, 1965, 1972, 1984. Primary and secondary dunes.

Carex hormathodes Fern.—Occasional. Recorded in 1984. Seasonal ponds.

Carex debilis Michx. var. *rudgei* Bailey—Rare. Last recorded in 1972. Thickets near landing, Inward Point. May no longer occur due to loss of habitat.

Carex livida (Wahlenb.) Willd.—Recorded in 1965. Unknown location. Probably a misidentification; *C. livida* inhabits calcareous fens.

Carex comosa Boott—Rare. Recorded in 1969, 1972. Seasonal ponds.

Carex lurida Wahlenb.—Occasional. Recorded in 1984. Seasonal ponds and bogs.

LEMNACEAE

Spirodela polyrhiza (L.) Schleid.—Common. Recorded in 1972, 1984. Permanent and seasonal ponds.

JUNCACEAE

Juncus bufonius L. var. *halophilus* Buchenau and Fern.—Occasional. Recorded in 1972, 1983, 1984. Permanent and seasonal ponds.

Juncus gerardi Loisel.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1984. Salt marshes.

Juncus tenuis Willd.—Rare. Recorded in 1972. Brick pavement at lighthouse.

Juncus dichotomus Ell.—Common. Recorded in 1965, 1972, 1981, 1984. Seasonal ponds.

Juncus greenei Oakes and Tuckerm.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Secondary dunes and seasonal ponds.

Juncus effusus L.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1984. Permanent ponds and seasonal ponds.

Juncus balticus Willd.—Occasional. Recorded in 1972. Seasonal ponds and salt marshes.

Juncus canadensis J. Gay—Occasional. Recorded in 1965, 1972, 1984. Seasonal ponds.

Juncus subcaudatus (Engelm.) Coville and Blake—Occasional.
Recorded in 1965, 1972, 1984. Seasonal ponds.

Juncus acuminatus Michx.—Common. Recorded in 1954, 1965,
1969, 1983, 1985. Seasonal ponds.

Juncus articulatus L.—Rare. Recorded in 1972. Seasonal ponds.

Luzula multiflora (Retz.) LeJeune—Rare. Recorded in 1984.
Seasonal ponds.

LILIACEAE

Smilacina stellata (L.) Desf.—Rare. Last recorded in 1969.
Thickets at Inward Point. May no longer occur because the
habitat at Inward Point was destroyed in 1978.

Smilax rotundifolia L.—Rare. Last recorded in 1972. Thickets
at Inward Point. May no longer occur because the habitat
at Inward Point was destroyed in 1978.

IRIDACEAE

Sisyrichium angustifolium Mill.—Occasional. Recorded in 1954,
1965, 1969, 1972, 1984. Seasonal ponds.

Iris prismatica Pursh—Rare. Recorded in 1984. Seasonal ponds.

Iris versicolor L.—Abundant. Recorded in 1954, 1965, 1969,
1972, 1984. Permanent ponds, seasonal ponds and bogs.

ORCHIDACEAE

Habenaria lacera (Michx.) Lodd.—Rare. Recorded in 1981,
1984. Bogs.

Pogonia ophioglossoides (L.) Ker—Occasional. Recorded in
1954, 1965, 1969, 1972, 1981, 1984. Seasonal ponds and
bogs.

Spiranthes cernua (L.) Richard—Occasional. Recorded in 1965,
1972, 1981, 1984. Seasonal ponds and bogs.

Dicotyledoneae

SALICACEAE

Salix nigra Marsh.—Rare. Recorded in 1984. Seasonal ponds.

Salix bebbiana Sarg.—Common. Recorded in 1965, 1972, 1984.
Seasonal ponds.

Salix discolor Muhl.—Recorded in 1965, 1969, 1972. Seasonal ponds and adjacent thickets. There are two specimens at SPWH: “thickets in hollow of dunes between Inward Point and Lighthouse.”

MYRICACEAE

Myrica pensylvanica Loisel.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1981, 1983, 1984. Secondary dunes and seasonal ponds.

Myrica gale L.—Rare. Recorded in 1981. Permanent ponds.

BETULACEAE

Betula populifolia Marsh.—Rare. Recorded in 1984. Seasonal ponds.

FAGACEAE

Quercus ilicifolia Wang.—Rare. Recorded in 1965, 1972. Unknown location. May no longer occur because the habitat at Inward Point was destroyed in 1978.

POLYGONACEAE

Rumex crispus L.—Common. Recorded in 1954, 1965, 1969, 1972, 1984. Seasonal ponds and secondary dunes.

Rumex maritimus L. var. *fueginus* (Phil.) Dusen—Occasional. Recorded in 1938 (*Seymour 5140*, NEBC), 1969 (Moul, SPWH), 1981, 1984. Permanent ponds.

Rumex acetosella L.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1984. Permanent ponds and seasonal ponds.

Polygonum glaucum Nutt.—Rare. Recorded in 1965, 1972, 1985. Beach at south end of South Island.

Polygonum pensylvanicum L. var. *nesophilum* Fern.—Occasional. Recorded in 1969. Seasonal ponds. Moul's collection (at SPWH) proves to be this little known and geographically restricted taxon. In addition, F. C. Seymour collected this same variety on Monomoy in 1938 (NEBC).

Polygonum persicaria L.—Recorded in 1965, 1972. Seasonal ponds.

Polygonum punctatum Ell. var. *leptostachyum* (Meisn.) Small—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Seasonal ponds.

Polygonum hydropiperoides Michx.—Abundant. Recorded in 1965, 1972, 1984. Permanent ponds and seasonal ponds.

Polygonum scandens L.—Occasional. Recorded in 1954, 1965, 1972, 1984. Seasonal ponds.

Polygonella articulata (L.) Meisn.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes and seasonal ponds.

CHENOPODIACEAE

Bassia hirsuta (L.) Aschers.—Recorded in 1965, 1969, 1972. Unknown location. Normally inhabits upper borders of salt marshes. A specimen originally determined by Moul as *Suaeda maritima* is this species: “Area #3. Edge of salt marsh. (Inward Point)” (SPWH).

Chenopodium graveolens Lag. & Rodr.—Recorded in 1965. Unknown location. Probably mistaken for *C. carinatum* R. Br., which occurs in waste places and beaches in southeastern Cape Cod.

Atriplex patula L. var. *hastata* (L.) Gray—Common. Recorded in 1954, 1965, 1969, 1972, 1984. Secondary dunes and beaches.

Atriplex arenaria Nutt.—Common. Recorded in 1954, 1965, 1969, 1972, 1984. Secondary dunes, beaches and borders of salt marshes.

Salicornia bigelovii Torr.—Occasional. Recorded in 1969, 1972, 1984. Salt marshes.

Salicornia europaea L.—Common. Recorded in 1954, 1969, 1972, 1984. Salt marshes.

Salicornia virginica L.—Occasional. Recorded in 1965, 1969, 1972, 1984. Salt marshes.

Suaeda maritima (L.) Dumort.—Common. Recorded in 1954, 1965, 1972, 1984. Salt marshes.

Suaeda richii Fern.—Occasional. Recorded in 1965, 1972, 1981. Tidal salt flats.

Suaeda americana (Pers.) Fern.—Rare. Recorded in 1971, 1989. Tidal salt flats south of Inward Point. Specimen at NEBC. In 1989 this species was found to be numerous on a salt flat at the south end of North Island.

Suaeda linearis (Ell.) Moq.—Rare. Recorded in 1965. Unknown location.

Salsola kali L.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Beaches, sandspits and borders of salt marshes.

PHYTOLACCACEAE

Phytolacca americana L.—Occasional. Recorded in 1965, 1969, 1972, 1983, 1984. Seasonal ponds.

AIZOACEAE

Mollugo verticillata L.—Occasional. Recorded in 1965, 1972, 1981, 1983, 1984. Secondary dunes, permanent ponds and seasonal ponds.

CARYOPHYLLACEAE

Spergularia marina (L.) Griseb.—Occasional. Recorded in 1969, 1980, 1984. Salt marshes and tidal sand flats.

Arenaria peploides L.—Common. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Beaches and borders of salt marshes.

Stellaria media (L.) Cyrillo—Occasional. Recorded in 1984. Secondary dunes.

Cerastium vulgatum L.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes.

Dianthus armeria L.—Rare. Recorded in 1969. Thickets by seasonal ponds.

CERATOPHYLLACEAE

Ceratophyllum demersum L.—Common. Recorded in 1965, 1972, 1984. Permanent ponds.

NYMPHAEACEAE

Nymphaea odorata Ait.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Permanent ponds.

PAPAVERACEAE

Glaucium flavum Crantz—Rare. Recorded in 1985. Secondary dunes.

CRUCIFERAE

Draba verna L.—Occasional. Recorded in 1972, 1984. Secondary dunes.

Lepidium campestre (L.) R. Br.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes.

Lepidium virginicum L.—Common. Recorded in 1954, 1965, 1969, 1972, 1984. Secondary dunes.

Cakile edentula (Bigel.) Hook.—Common. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Beaches and primary dunes.

Raphanus raphanistrum L.—Occasional. Recorded in 1984. Secondary dunes.

Barbarea vulgaris R. Br.—Occasional. Recorded in 1984. Secondary dunes and seasonal ponds.

DROSERACEAE

Drosera rotundifolia L.—Occasional. Recorded in 1965, 1969, 1972, 1981, 1983, 1984. Bogs.

ROSACEAE

Spiraea tomentosa L.—Common. Recorded in 1954, 1965, 1969, 1972, 1981, 1983, 1984. Seasonal ponds.

Pyrus communis L.—Cultivated. Recorded in 1984. Secondary dunes. Represented by a single tree.

Pyrus malus L.—Cultivated. Recorded in 1984. Secondary dunes. Represented by two trees.

Pyrus arbutifolia (L.) L. f.—Rare. Recorded in 1965, 1972, 1984. Secondary dunes and seasonal ponds.

Pyrus melanocarpa (Michx.) Willd.—Recorded in 1972. Thickets at Inward Point landing place. This species has been considered a variety of *P. arbutifolia*; the specimen at NEBC has black fruits of the former and hairy leaves of the latter.

Amelanchier canadensis (L.) Medic.—Occasional. Recorded in 1965, 1969, 1972, 1984. Secondary dunes and seasonal ponds. In 1969 Moul cited *A. laevis* Wieg. from Monomoy; the specimen is *A. canadensis*.

Amelanchier laevis Wieg.—Recorded in 1969. Secondary dunes in thickets. Mistaken for *A. canadensis*.

Potentilla norvegica L.—Occasional. Recorded in 1972, 1981, 1984. Seasonal ponds.

Potentilla simplex Michx.—Occasional. Recorded in 1984. Seasonal ponds.

Potentilla egedei Wormsk. var. *groenlandica* (Tratt.) Polunin—Rare. Recorded in 1969. Salt marshes at Inward Point. May not occur anymore because the habitat where it occurred was destroyed in 1978.

Rubus idaeus L. var. *strigosus* (Michx.) Maxim.—Occasional. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.

Rubus hispidus L.—Common. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.

Rubus pensilvanicus Poir.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes.

Rosa nitida Willd.—Recorded in 1969. Secondary dunes. Misidentification of *R. virginiana*; *R. nitida* is a species of northern bogs and swamps.

Rosa virginiana Mill.—Occasional. Recorded in 1954, 1969, 1984. Secondary dunes. This is the common species of coastal thickets in southeastern Massachusetts. Moul's *Rosa nitida* Willd. and *R. carolina* L. were misidentifications of *R. virginiana* (specimens at SPWH).

Rosa palustris Marsh.—Recorded in 1954. Unknown location. Possible misidentification of *R. virginiana*.

Rosa carolina L.—Rare. Recorded in 1969. Secondary dunes. Misidentification of *R. virginiana*.

Rosa rugosa Thunb.—Common. Recorded in 1954, 1965, 1969, 1972, 1984. Secondary dunes.

Prunus maritima Marsh.—Common. Recorded in 1954, 1965, 1969, 1972, 1984. Secondary dunes.

Prunus persica (L.) Batsch—Cultivated. Recorded in 1969. Hedge by abandoned house in secondary dunes.

Prunus serotina Ehrh.—Occasional. Recorded in 1965, 1969, 1972, 1983, 1984. Secondary dunes.

LEGUMINOSAE

Trifolium arvense L.—Recorded in 1965, 1972. Unknown location.

Trifolium repens L.—Recorded in 1965, 1972. Unknown location.

Trifolium agrarium L.—Recorded in 1954. Unknown location.

Lathyrus japonicus Willd.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1984. Primary and secondary dunes, and borders of salt marshes.

LINACEAE

Linum striatum Walt. var. *multijugum* Fern.—Occasional. Recorded in 1981, 1983, 1984. Seasonal ponds and bogs.

OXALIDACEAE

Oxalis stricta L.—Rare. Recorded in 1984. Seasonal ponds.

EUPHORBIACEAE

Euphorbia cyparissias L.—Rare. Recorded in 1984. Secondary dunes.

Euphorbia polygonifolia L.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Secondary dunes, beaches, and sand-spits.

CALLITRICHACEAE

Callitriche stagnalis Scop.—Recorded in 1965. Possible mis-identification, prefers running waters; *C. heterophylla* Pursh is the expected species of brackish and muddy shores.

ANACARDIACEAE

Rhus radicans L.—Abundant. Recorded in 1965, 1969, 1972, 1983, 1984. Primary and secondary dunes.

AQUIFOLIACEAE

Ilex opaca Ait.—Cultivated. Recorded in 1984. Secondary dunes. Represented by two small trees growing next to the lighthouse.

Ilex verticillata (L.) Gray—Occasional. Recorded in 1965, 1969, 1972, 1984. Secondary dunes and seasonal ponds.

Ilex laevigata (Pursh) Gray—Recorded in 1954. Unknown location. Probably mistaken for *I. verticillata*; preferred habitat is red maple and Atlantic white cedar swamps.

MALVACEAE

Hibiscus palustris L.—Common. Recorded in 1965, 1972, 1983, 1984. Permanent and seasonal ponds.

GUTTIFERAE

Hypericum boreale (Britt.) Bickn.—Common. Recorded in 1965, 1969, 1972, 1981, 1983, 1984. Permanent and seasonal ponds.

Hypericum canadense L.—Rare. Recorded in 1965, 1972, 1981. Permanent ponds.

Hypericum virginicum L.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1981, 1984. Permanent and seasonal ponds.

CISTACEAE

Hudsonia tomentosa Nutt.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1981, 1983, 1984. Secondary dunes.

Lechea villosa Ell.—Occasional. Recorded in 1954, 1965, 1972, 1983, 1984. Secondary dunes.

Lechea maritima Leggett—Common. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.

VIOLACEAE

Viola pallens (Banks) Brainerd—Recorded in 1965, 1972. Unknown location.

Viola lanceolata L.—Occasional. Recorded in 1965, 1969, 1972, 1981, 1984. Permanent ponds, seasonal ponds and bogs.

ELAEAGNACEAE

Elaeagnus umbellata Thunb.—Cultivated. Recorded in 1984. Secondary dunes.

LYTHRACEAE

Decodon verticillatus (L.) Ell.—Common. Recorded in 1965, 1972, 1984. Permanent and seasonal ponds.

Lythrum salicaria L.—Rare. Recorded in 1972. Unknown location.

ONAGRACEAE

Ludwigia palustris (L.) Ell. var. *americana* (DC.) Fern. & Griscom—Common. Recorded in 1965, 1969, 1972, 1981, 1983, 1984. Permanent and seasonal ponds.

Epilobium leptophyllum Raf.—Occasional. Recorded in 1965, 1972, 1984. Seasonal ponds and bogs. Also collected in 1938 by F. C. Seymour (NEBC).

Epilobium glandulosum Lehm. var. *adenocaulon* (Haussk.) Fern.—Occasional. Recorded in 1965, 1972, 1983, 1984. Seasonal ponds. Also collected in 1938 by F. C. Seymour (NEBC).

Oenothera biennis L.—Occasional. Recorded in 1954, 1965, 1972. Primary and secondary dunes. Some of these may refer to *O. parviflora*, the common species of maritime habitats.

Oenothera parviflora L.—Common. Recorded in 1984. Primary and secondary dunes.

Oenothera perennis L.—Occasional. Recorded in 1984. Secondary dunes.

UMBELLIFERAE

Ptilimnium capillaceum (Michx.) Raf.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1981, 1983, 1984. Permanent and seasonal ponds.

Ligusticum scothicum L.—Occasional. Recorded in 1954, 1965, 1972, 1984. Secondary dunes and upper borders of salt marshes.

Daucus carota L.—Rare. Recorded in 1954, 1965, 1969, 1972. Secondary dunes.

CLETHRACEAE

Clethra alnifolia L.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes and seasonal ponds.

ERICACEAE

Kalmia angustifolia L.—Occasional. Recorded in 1954, 1984. Seasonal ponds and bogs.

Lyonia ligustrina (L.) DC.—Occasional. Recorded in 1965, 1969, 1972, 1984. Wet thickets in secondary dunes and bogs.

Arctostaphylos uva-ursi (L.) Spreng.—Recorded in 1954. Unknown location. May no longer occur.

Gaylussacia baccata (Wang.) K. Koch—Rare. Recorded in 1984. Borders of bogs.

Vaccinium corymbosum L.—Occasional. Recorded in 1965, 1969, 1972, 1984. Seasonal ponds and bogs.

Vaccinium angustifolium Ait.—Borders of thickets. Dune top, center of island. Inward Point, Area #3. 1 August 1966, Moul, Hough, & Fairbrothers 66-138 (SPWH). This species was omitted by Moul (1969).

Vaccinium oxycoccos L.—Recorded in 1965. Bogs. Probably mistaken for narrow-leaved plants of *V. macrocarpon*.

Vaccinium macrocarpon Ait.—Occasional. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Seasonal ponds and bogs.

PRIMULACEAE

Lysimachia terrestris (L.) BSP.—Occasional. Recorded in 1954, 1965, 1972, 1984. Seasonal ponds.

Trientalis borealis Raf.—Rare. Recorded in 1965, 1969, 1972. Thickets in secondary dunes and seasonal ponds.

PLUMBAGINACEAE

- Limonium carolinianum* (Walt.) Britt.—Recorded in 1965, 1969, 1972. Salt marshes. Moul's (1969) specimens are immature and identification cannot be confirmed to taxon.
- Limonium nashii* Small—Abundant. Recorded in 1984. Salt marshes. Recent taxonomy places *L. Nashii* within *L. carolinianum*. Past *L. carolinianum* records probably refer to *L. nashii*, the taxon with hairy calyx tubes which is the overwhelmingly more common taxon in Massachusetts.

GENTIANACEAE

- Bartonia virginica* (L.) BSP.—Rare. Recorded in 1972, 1981. Bogs and seasonal ponds.
- Bartonia paniculata* (Michx.) Muhl.—Recorded in 1965. Possibly mistaken for *B. virginica*; prefers red maple and Atlantic white cedar swamps.

ASCLEPIADACEAE

- Asclepias incarnata* L. var. *pulchra* (Ehrh.) Pers.—Occasional. Recorded in 1984. Permanent and seasonal ponds.

CONVOLVULACEAE

- Convolvulus sepium* L.—Common. Recorded in 1965, 1972, 1984. Secondary dunes.
- Cuscuta compacta* Juss.—Occasional. Recorded in 1984. Secondary dunes.

LABIATAE

- Teucrium canadense* L.—Abundant. Recorded in 1965, 1969, 1972, 1983, 1984. Permanent and seasonal ponds.
- Scutellaria epilobiifolia* A. Hamilton—Common. Recorded in 1965, 1969, 1972, 1984. Permanent and seasonal ponds.
- Scutellaria* × *churchilliana* Fern.—Very common. Area #2. Lighthouse area. Edge of a fresh water pond. Moul 65-99 (SPWH), 26 Jul 1965. Originally identified as *S. epilobiifolia*, this specimen is actually a hybrid of *S. epilobiifolia* and *S. lateriflora*.
- Stachys palustris* L.—Recorded in 1954. Unknown location. Possibly mistaken for *Teucrium canadense*; *S. palustris* prefers nutrient-rich marshes and river meadows.

Lycopus virginicus L.—Rare. Recorded in 1965, 1972. Permanent and seasonal ponds.

Lycopus uniflorus Michx.—Common. Recorded in 1954, 1965, 1972, 1984. Permanent and seasonal ponds.

Lycopus americanus Muhl.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Permanent and seasonal ponds.

SOLANACEAE

Solanum dulcamara L.—Occasional. Recorded in 1965, 1984. Secondary dunes.

Solanum americanum Mill.—Occasional. Recorded in 1972, 1984. Secondary dunes.

Lycopersicum esculentum Mill.—Rare. Recorded in 1984. Secondary dunes.

SCROPHULARIACEAE

Verbascum thapsus L.—Occasional. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.

Linaria vulgaris Hill—Occasional. Recorded in 1969, 1984. Secondary dunes.

Linaria canadensis (L.) Dumont—Common. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Primary and secondary dunes and seasonal ponds.

Limosella subulata Ives—Common. Recorded in 1981, 1983, 1984, 1985. Permanent ponds.

Lindernia anagallidea (Michx.) Pennell—Occasional. Recorded in 1972, 1983, 1984. Permanent and seasonal ponds.

Veronica arvensis L.—Rare. Recorded in 1984. Secondary dunes.

Gerardia purpurea L.—Common. Recorded in 1981, 1984. Permanent and seasonal ponds.

PLANTAGINACEAE

Plantago major L.—Rare. Recorded in 1972. Seasonal pond. The specimen at NEBC appears to be var. *scopulorum* Fries & Broberg, the expected taxon of saline environments.

Plantago oliganthos E. & S.—Occasional. Recorded in 1965, 1969, 1972, 1984. Salt marshes.

Plantago lanceolata L.—Occasional. Recorded in 1972, 1984.
Secondary dunes.

RUBIACEAE

Galium palustre L.—Recorded in 1954, 1965. Permanent and seasonal ponds. Possibly mistaken for *G. trifidum*.

Galium trifidum L.—Abundant. Recorded in 1969, 1972, 1984. Permanent and seasonal ponds. Moul's specimen, cited in his 1969 paper as *G. palustre*, has been annotated to *G. trifidum*.

CAPRIFOLIACEAE

Lonicera Morrowi Gray—Rare. Recorded in 1984. Secondary dunes.

Viburnum dentatum L.—Occasional. Recorded in 1965, 1969, 1972. Moist thickets in secondary dunes and seasonal ponds.

Viburnum recognitum Fern.—Occasional. Recorded in 1984. Secondary dunes and seasonal ponds.

CUCURBITACEAE

Cucurbita pepo L.—Rare. Recorded in 1989. Disturbed low sand ridge in salt marsh, North Monomoy.

COMPOSITAE

Eupatorium dubium Willd.—Occasional. Recorded in 1984. Seasonal ponds.

Eupatorium perfoliatum L.—Rare. Recorded in 1954, 1965, 1972. Seasonal ponds.

Chrysopsis falcata (Pursh) Ell.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1981, 1983, 1984. Primary and secondary dunes.

Solidago sempervirens L.—Abundant. Recorded in 1954, 1965, 1969, 1972, 1983, 1984. Primary and secondary dunes.

Solidago rugosa Ait.—Rare. Recorded in 1965, 1972. Unknown location.

Solidago graminifolia (L.) Salisb.—Common. Recorded in 1954, 1965, 1972, 1984. Secondary dunes.

Solidago tenuifolia Pursh—Common. Recorded in 1969, 1972, 1981, 1984. Secondary dunes and seasonal ponds.

Aster pilosus Willd. var. *demotus* Blake—Rare. Recorded in 1965. Unknown location.

- Aster ericoides* L.—Rare. Recorded in 1965. Unknown location.
- Aster dumosus* L.—Rare. Recorded in 1972, 1981. Seasonal ponds.
- Aster novi-belgii* L.—Occasional. Recorded in 1972, 1981, 1984. Secondary dunes and seasonal ponds.
- Aster linariifolius* L.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes.
- Aster subulatus* Michx.—Occasional. Recorded in 1972, 1984. Salt marshes.
- Erigeron canadensis* L.—Rare. Recorded in 1954, 1981. Secondary dunes.
- Erigeron pusillus* Nutt.—Common. Recorded in 1972, 1981, 1984. Secondary dunes.
- Baccharis halimifolia* L.—Common. Recorded in 1969, 1972, 1984. Secondary dunes and borders of salt marshes.
- Pluchea purpurascens* (Sw.) DC.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Secondary dunes, seasonal ponds and borders of salt marshes.
- Anaphalis margaritacea* (L.) C. B. Clarke—Recorded in 1954, 1965, 1972. Unknown location.
- Gnaphalium obtusifolium* L.—Common. Recorded in 1965, 1969, 1972, 1983, 1984. Secondary dunes.
- Iva frutescens* L.—Occasional. Recorded in 1984. Borders of salt marshes.
- Ambrosia artemisiifolia* L.—Occasional. Recorded in 1954, 1965, 1972, 1984. Secondary dunes.
- Xanthium chinense* Mill.—Recorded in 1954. Unknown location. See *X. strumarium*.
- Xanthium marina*—Recorded in 1954. Unknown location. See *X. strumarium*.
- Xanthium strumarium* L.—Common. Recorded in 1965, 1972, 1984. Beaches, sandspits, and primary and secondary dunes. *Xanthium marina*, *X. chinense*, and *X. echinatum* are included in *X. strumarium* by current taxonomists.
- Xanthium echinatum* Murr.—Recorded in 1969. Primary and secondary dunes. See *X. strumarium*.
- Bidens cernua* L.—Common. Recorded in 1984. Permanent and seasonal ponds.
- Bidens tripartita* L.—Recorded in 1972. Unknown location. Probably mistaken for *B. frondosa*, the common species of moist pond shores in southeastern Massachusetts.

- Bidens frondosa* L.—Occasional. Recorded in 1954, 1965, 1972. Seasonal ponds.
- Achillea millefolium* L.—Occasional. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.
- Chrysanthemum leucanthemum* L.—Rare. Recorded in 1954, 1965, 1972. Unknown location.
- Artemesia caudata* Michx.—Occasional. Recorded in 1954, 1965, 1969, 1972, 1984. Secondary dunes.
- Artemesia stelleriana* Bess.—Common. Recorded in 1954, 1965, 1969, 1972, 1984. Primary and secondary dunes. Also collected in 1932 by C. A. Weatherby (GH).
- Erechtites hieracifolia* (L.) Raf.—Rare. Recorded in 1965, 1969, 1972, 1984. Secondary dunes and borders of salt marshes.
- Senecio vulgaris* L.—Rare. Recorded in 1984. Secondary dunes.
- Cirsium vulgare* (Savi) Tenore—Common. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.
- Cirsium arvense* (L.) Scop.—Rare. Recorded in 1954. Unknown location.
- Cichorium intybus* L.—Rare. Recorded in 1972. Secondary dunes.
- Hypochoeris radicata* L.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes and seasonal ponds.
- Taraxacum officinale* Weber—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes.
- Sonchus arvensis* L.—Rare. Recorded in 1981, 1984. Secondary dunes and borders of permanent and seasonal ponds.
- Sonchus asper* (L.) Hill—Occasional. Recorded in 1965, 1969, 1972, 1984. Secondary dunes.
- Lactuca canadensis* L. var. *latifolia* Ktze.—Occasional. Recorded in 1965, 1972, 1984. Secondary dunes.
- Lactuca biennis* (Moench) Fern.—Rare. Recorded in 1973 by BAS. Secondary dunes.
- Hieracium florentinum* All.—Common. Recorded in 1984. Secondary dunes.

ACKNOWLEDGMENTS

We express our gratitude and appreciation to everyone who helped see this project through to completion. Thanks are due to David Folger for initial impetus, to the late Marcia Norman, and Edward Norman who provided many hours of valuable identi-

fication assistance and friendship, and to the following who helped in many other ways: Wallace Bailey, William DeRagon, Carollee Ferris, Robert Humphrey, Richard LeBlond, Thomas Lee, Blair Nikula, Robert Prescott and Peter Trull. We also wish to thank the curators of NEBC, GH, and SPWH for access to specimens in their care.

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